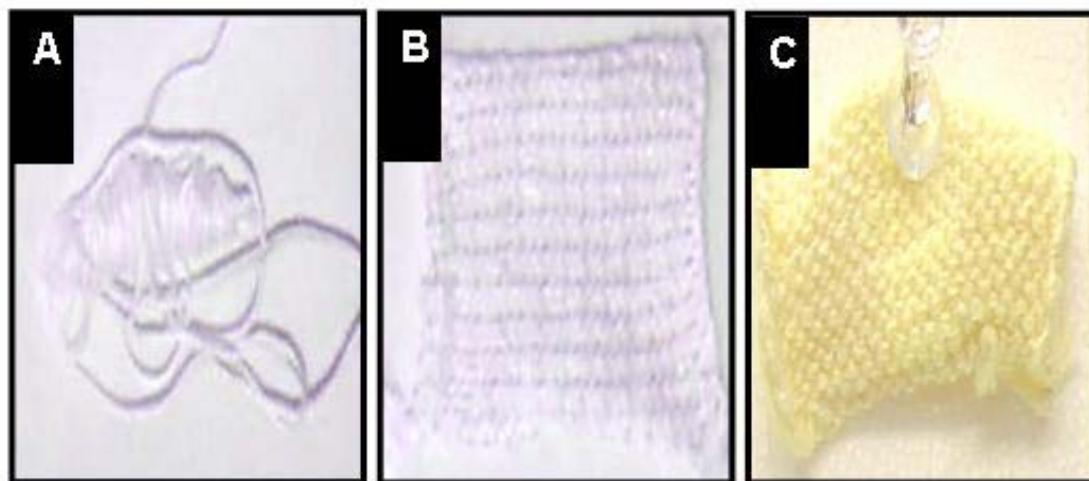


SELF-DECONTAMINATING FILTERS, CLOTHING, AND DISPOSABLE WIPES



The Naval Research Laboratory (NRL) has developed a new self-decontaminating coating for use in filters, protective clothing, and disposable wipes that is capable of actively destroying pesticides and related chemical agents on contact. The coating comprises a thin, layered, composite film containing enzymes, which actively degrade chemical toxins, and a polyelectrolyte binder. It is readily applied to substrates such as beads, fabrics, or paper by inexpensive methods such as dip coating, spin coating or spraying. Our non-covalent method for incorporating enzymes within the polyelectrolyte film maintains enzyme activity, while stabilizing and protecting the enzyme from denaturation due to mechanical, chemical, and environmental stress. For example, filters prepared using beads coated with films containing organophosphorous hydrolase enzyme completely hydrolyzed methyl parathion (MPT) pesticide in an aqueous-alcohol solution under continuous flow conditions at room temperature for at least 8 months. In the figure above, a cotton thread coated with our film (A) was woven into a fabric (B). On contact with an MPT solution, the fabric developed a yellow color (C) characteristic of *p*-nitrophenol, the hydrolysis product of MPT, demonstrating MPT degradation. Disposable paper towels similarly coated function identically (not shown). Our materials offer unique platforms as effective systems for the active, self-decontamination of chemical toxins for homeland defense, agricultural, and related applications (US patent pending: US Patent Applications # 10/750,637 (12.23.2003) and 10/849,621 (05.20, 2004)).

Advantages/Features Include:

- Low cost materials and coating application processing
- Lengthened enzyme activity compared to solution
- Enhanced enzyme stability compared to solution
- Efficient degradation of toxins on contact
- Self-decontaminating- coating actively and continuously degrades toxins
- Versatility- enzymes can be selected for activity against target toxin

Applications Include:

- Personal Protection (e.g., gloves, masks, clothing) - exposure to chemical agents
- Water Purification (e.g., filters) - pesticide remediation in aqueous environments
- Surface Decontamination (e.g., disposable wipes) - chemical spill cleanup

Licenses are available to companies with commercial interest.

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